CHAPTER 3: OPPORTUNITY TO LEARN

Introduction

Two item review workshops were conducted during Year 1 of the evaluation effort. Educators from districts in our longitudinal study met in northern or southern California to review the test items (questions) that were included in the Spring 2000 HSEE Field Test. For each question, workshop participants were asked to rate the degree to which the question measured the targeted content standard and to estimate the proportion of students in their schools who received sufficient instruction to answer the question correctly. The specific procedures used and detailed information on the initial findings are described in the June 30 report (Wise, et al., 2000). Three main findings emerged from the item review workshops:

1. Consistent with review by the HSEE Panel and its Technical Committee, the questions were found to measure the target standards well.
2. For a significant proportion of the questions, our workshop participants estimated that more than 25% of all students had not received instruction that would ensure their ability to answer the question correctly.
3. For the questions reviewed, there was a significant relationship between the curriculum alignment (opportunity to learn) ratings collected in the item review workshops and the passing rates in the field test.

Two additional questions were addressed in our supplemental analyses. These questions arose in discussions with the Board and the HSEE Panel about our original Year 1 report. They were:

1. How representative were the 12 districts that participated in the item review workshops? Is there any reason to expect that students from these districts would be significantly more or less well prepared for the HSEE in comparison to students from the state as a whole?
2. Which specific standards had the most significant indications of opportunity-to-learn problems?

In addition to the supplemental analyses reported here, we have been asked to collect additional information on opportunities to learn the HSEE content standards from all districts serving California high school students. We are developing a new survey timed to reach districts shortly after the Board is expected to formally adopt specific HSEE content standards at its September meeting. The survey will go beyond collecting baseline information on the current status of curriculum and instruction, requesting information on planned changes in response to HSEE requirements as well. Preliminary results from this survey are expected to be available for the Board's November meeting.

Comparison of Participating Districts to the State as a Whole

The primary focus of our item rating panels was on judging the content match of the field test questions to test specifications; however, we also used the opportunity to ask about ongoing instruction related to those questions. For the item content judgments, we were

assessing test questions and did not need to be particularly concerned about how well our workshop participants represented the whole state. On the other hand, the curriculum-alignment (opportunity-to-learn) ratings are an assessment of districts. Therefore, how well the participants represent the state is an important concern. We did indicate in the previous report that, on a question-by-question basis, our workshop participants' ratings did predict students' field test performance. Questions rated with relatively low "curriculum alignment" ratings tended to be the questions on which students performed the worst in the HSEE field test.

The tables that follow describe the extent to which the districts of our workshop participants are representative of all districts in the state. "Target sample" in these tables refers to the 24 districts selected for our longitudinal study of the HSEE. Our entire target sample was invited to send representatives to the workshops. "Participating districts" indicate the districts that did attend. Table 3.1 shows a comparison of the target and participating districts in terms of the measures we used in selecting the target sample. Half of the districts in our target sample were classified as having above average number of English language learners (High ELL). Of the districts participating in the ELA panels, 57 percent were High ELL. Similarly, 48% of the districts participating in the mathematics panels were High ELL. While most of the comparisons in Table 3.1 indicate close agreement between the target and participating districts, there were a few significant differences. More of the districts participating in the mathematics panels were classified as "High Math" based on 1999 STAR scores (64% compared to 50%). Somewhat fewer of the participating districts were classified as "Small" (25% and 24% compared to 33%). Also fewer of the districts participating in the ELA panels were classified as large (24% compared to 33%) resulting in overrepresentation of middle-sized districts (62% compared to 33%).

Table 3.1
Comparison of Participating Districts to the Target Sample of Districts

District Statistics	Target Sample	Participating Districts[1]	
		ELA	Math
Percent High English Lang. Learners	50	57	48
Percent High STAR 1999 Math	50	52	64
Percent in Large Districts	33	24	32
Percent in Medium Districts	33	62	44
Percent in Small Districts	33	25	24
Number of Districts	24	12	12

Tables 3.2 and 3.3 show comparisons of achievement scores from the Standardized Testing and Reporting (STAR) Program for the participating and target districts and for all districts in the state. Table 3.2 shows comparisons of average 10th grade mathematics and reading scores on the 2000 STAR. This information was not available when the sample was selected in March 2000, but it now provides the most up-to-date basis for comparison on key measures of student achievement. The first row of each table shows the averages for all schools, with each school weighted by the number of 10th grade students so that the averages

are average scores for all 10th grade students in the state. The remaining rows provide means for the target and participating districts, with the participating districts weighted by the number of participants. For mathematics, the statewide average was 698, the average for districts in the target sample was 700 and the average for districts participating in the item review workshops was 699. For the ELA panels, the corresponding numbers were 691 for the statewide average, 693 for the target sample, and 690 for the workshops participants. Table 3.2 also shows standard deviations that indicate the degree of variation in average scores across districts. The standard deviations were quite a bit smaller for the participating districts (7 to 10 compared to 19 for the state as a whole). This means that we had fewer very high scoring and fewer very low scoring districts in comparison to the state as a whole.

Table 3.2
Comparison of Participating Districts to Statewide STAR 2000 Results

Population/Sample	Mathematics		Reading	
	Average	Standard Deviation	Average	Standard Deviation
All Districts[1]	698	19.1	691	19.2
Target Sample[1]	700	12.9	693	14.1
ELA Workshop Participants[2]	697	8.1	691	9.9
Math Workshop Participants[2]	699	7.1	694	9.3

[1] Average scores for each district were weighted by the number of 10th grade students in the district to get overall averages.
[2] Average scores for each district were weighted by the number of workshop participants from the district to get overall averages.

For completeness, Table 3.3 shows comparisons of district averages for the 1999 STAR scores that were used in selecting the target districts. These results were very similar to the comparisons based on the 2000 STAR scores. Statewide means were 697 and 690 for mathematics and reading respectively while the corresponding means for the participating districts were 698 and 690. The differences in standard deviations between the participating districts and the state as a whole were quite a bit smaller than was the case for the STAR 2000 results.

Table 3.3
Comparison of Participating Districts to Statewide STAR 1999 Results

Population/Sample	Mathematics		Reading	
	Average	Standard Deviation	Average	Standard Deviation
All Districts[1]	697	12.5	690	13.2
Target Sample[1]	698	11.0	692	12.6
ELA Workshop Participants[2]	695	8.3	690	10.3
Math Workshop Participants[2]	698	8.2	693	10.3

[1] Average scores for each district were weighted by the number of 10th grade students in the district to get overall averages.
[2] Average scores for each district were weighted by the number of workshop participants from the district to get overall averages.

Table 3.4 presents a final comparison of participating districts to statewide figures. We computed the percentage of students who were Hispanic and the percentage who were

English language learners (ELLs) from the 1999 STAR data. For the state as a whole, the percentages were 39 percent and 16 percent respectively. For the target sample of districts, the corresponding figures were slightly higher (43 percent and 18 percent). For the districts participating in our workshops, the figures were lower. The percentage of Hispanic students in districts participating in the mathematics panels was considerably lower than the statewide figure (29 percent compared to 39 percent).

Table 3.4
Comparison of 1999 Demographics for Participating Districts to Statewide Figures.

Population/Sample	% Hispanic	% English Language Learners (ELL)
All Districts[1]	39	16
Target Sample[1]	43	18
ELA Workshop Participants[2]	33	14
Math Workshop Participants[2]	29	13

[1] Average scores for each district were weighted by the number of 10th grade students in the district to get overall averages.
[2] Average scores for each district were weighted by the number of workshop participants from the district to get overall averages.

In summary, the districts participating in our item review workshops had average mathematics and reading achievement scores that matched statewide averages closely. There was some evidence that very high or low scoring districts and districts with higher percentages of Hispanic students were less likely to have been included in our panels.

Content Standards Not Covered in the Current Curriculum

In our initial report, we counted the number of field test questions for which our workshop participants indicated more than 25% of their students had not received instruction needed to answer the question correctly. Our summary count indicated that more than 25% of the students would not have received sufficient instruction for 50% of the mathematics questions and 90% of the English-Language Arts questions. Tables 3.3 and 3.4 in our June 30 report also showed the number and percentage of questions with low curriculum-alignment ratings for each major content category. For ELA, just over 80 percent of the language convention questions and over 90 percent of the questions in all other content categories had low curriculum alignment ratings. For mathematics, the percentages of questions with low curriculum-alignment ratings ranged from 20 percent for number sense to 80 percent for Algebra 1. We did not provide corresponding statistics for the individual content standards within each of the general categories. Members of the HSEE Panel and others have suggested that more detailed information would be useful to them.

In Tables 3.5a, 3.5b and 3.6, we provide complete results for each of the English language arts (reading and writing) and mathematics content standards. Note that several of the standards in the two tables do not have data. We report data only for those standards for which more than one question was included on the field test and rated in the workshops. In addition, no field test performance data is presented for the writing applications standards. These standards are all measured with essay questions scored on a 4-point scale. No decision

has yet been made as to what score a student has to receive on this scale to have "passed" the standard. Thus, we could not compute a percent passing statistic for the questions used to assess the writing applications standards.

We have highlighted the standards with the lowest passing rates and lowest curriculum-alignment ratings by printing both the standard and the corresponding statistics in **boldface**. Specifically, we highlighted standards where both of the following were true:

1. The average percent passing across all questions developed to assess the standard was less than 40% for mathematics or less than 55% for ELA.
2. The average 10^{th} Grade curriculum-alignment (CA) rating for these questions was less than 2.0. Category 2 of the curriculum-alignment ratings was "50–75% of 10th graders are provided with instruction that would allow them to pass the question." If the average rating was less than 2.0, then the panelists were saying that fewer than 50 percent of their students had been provided adequate opportunity to learn the material covered by the question.

For ELA, the standards for which students are least well prepared involve higher order analysis skills. For example, the ELA standard with the very lowest curriculum-alignment rating was:

> 3.12 (Literary Criticism). Analyze the way in which a work of literature is related to the themes and issues of its historical period. (Assessed with essay questions so no passing rates are available; CA Rating=1.3)

The current proposal is to use essay questions in the assessment of this standard. It would be helpful for the HSEE panel to provide illustrations or examples of questions that might be used to assess this standard and a discussion of the guidelines for scoring responses to these questions. Such information will be critical in determining minimum passing scores as well as useful to districts in increasing their coverage of this standard in the curriculum.

Some other examples of ELA standards that appear particularly problematic are:

> 2.3 (Comprehension and analysis of grade-level-appropriate text). Generate relevant questions about readings on issues that can be researched. (% Pass=49, CA Rating=1.6)
>
> 3.1 (Literary Response and Analysis). Articulate the relationship between the expressed purposes and the characteristics of different forms of dramatic literature (e.g., comedy, tragedy, drama, dramatic monologue). (% Pass=53, CA Rating=1.8)
>
> 1.5 (Writing Strategies). Synthesize information from multiple sources and identify complexities and discrepancies in the information and the different perspectives found in each medium (e.g., almanacs, microfiche, news sources, in-depth studies, speeches, journals, technical documents). (% Pass=48, CA Rating=1.7)

The current proposal is to use multiple-choice questions to assess these standards. Unfortunately, because of test security concerns, we cannot provide examples of questions designed to assess these standards. The Panel, CDE, and AIR should give a high priority to providing detailed examples of how the skills identified in these standards might be demonstrated. CDE and the development contractor are working on an Educators Guide that could meet this need.

Table 3.5a
Field Test Passing Rates and Curriculum-Alignment (CA) Ratings for each English/Language Arts Content Standard—Reading

STRANDS/STANDARDS [BOLDED STANDARDS INDICATE PROBLEM AREAS]	PERCENT PASSING	AVERAGE CA RATING
1.0 Word Analysis, Fluency, and Systematic Vocabulary Development		
Vocabulary and Concept Development		
1.1 Identify and use the literal and figurative meanings of words and understand word derivations.	61%	2.11
1.2 Distinguish between the denotative and connotative meanings of words and interpret the connotative power of words.	68%	2.10
2.0 Reading Comprehension (Focus on Informational Materials)		
Structural Features of Informational Materials		
8.2.1 Compare and contrast the features and elements of consumer materials to gain meaning from documents (e.g., warranties, contracts, product information, instructional manuals). [NOTE: This is a grade eight standard.]	61%	2.06
2.1 Analyze the structure and format of functional workplace documents, including the graphics and headers, and explain how authors use the features to achieve their purposes.	78%	2.35
2.2 Prepare a bibliography of reference materials for a report using a variety of consumer, work place, and public documents.	59%	1.67
Comprehension and Analysis of Grade-Level-Appropriate Text		
2.3 Generate relevant questions about readings on issues that can be researched.	**49%**	**1.61**
2.4 Synthesize the content from several sources or works by a single author dealing with a single issue; paraphrase the ideas and connect them to other sources and related topics to demonstrate comprehension.	61%	1.98
2.5 Extend ideas presented in primary or secondary sources through original analysis, evaluation, and elaboration.	63%	1.98

(table continues)

Table 3.5a

Field Test Passing Rates and Curriculum-Alignment (CA) Ratings for each English/Language Arts Content Standard—Reading (Continued)

STRANDS/STANDARDS [BOLDED STANDARDS INDICATE PROBLEM AREAS]	PERCENT PASSING	AVERAGE CA RATING
Expository Critique		
2.7 Critique the logic of functional documents by examining the sequence of information and procedures in anticipation of possible reader misunderstandings.	64%	1.67
2.8 Evaluate the credibility of an author's argument or defense of a claim by critiquing the relationship between generalizations and evidence, the comprehensiveness of evidence, and the way in which the author's intent affects the structure and tone of the text (e.g., in professional journals, editorials, political speeches, primary source material).	**52%**	**1.82**
3.0 Literary Response and Analysis:		
Structural Features of Literature		
3.1 Articulate the relationship between the expressed purposes and the characteristics of different forms of dramatic literature (e.g., comedy, tragedy, drama, dramatic monologue).	**50%**	**1.97**
Narrative Analysis of Grade-Level-Appropriate Text		
3.3 Analyze interactions between main and subordinate characters in a literary text (e.g., internal and external conflicts, motivations, relationships, influences) and explain the way those interactions affect the plot.	64%	2.16
3.4 Determine characters' traits by what the characters say about themselves in narration, dialogue, dramatic monologue, and soliloquy.	63%	2.10
3.5 Compare works that express a universal theme and provide evidence to support the ideas expressed in each work.	68%	1.93
3.6 Analyze and trace an author's development of time and sequence, including the use of complex literary devices (e.g., foreshadowing, flashbacks).		
3.7 Recognize and understand the significance of various literary devices, including figurative language, imagery, allegory, and symbolism, and explain their appeal.	**53%**	**1.77**
3.8 Interpret and evaluate the impact of ambiguities, subtleties, contradictions, ironies, and incongruities in a text.	**54%**	**1.67**
3.9 Explain how voice, persona, and the choice of a narrator affect characterization and the tone, plot, and credibility of a text.	59%	1.96
3.10 Identify and describe the function of dialogue, scene designs, soliloquies, asides, and character foils in dramatic literature.	59%	1.88

(table continues)

Table 3.5a

Field Test Passing Rates and Curriculum-Alignment (CA) Ratings for each English/Language Arts Content Standard—Reading (Continued)

STRANDS/STANDARDS [BOLDED STANDARDS INDICATE PROBLEM AREAS]	PERCENT PASSING	AVERAGE CA RATING
Literary Criticism		
8.3.7 Analyze a work of literature, showing how it reflects the heritage, traditions, attitudes, and beliefs of its author. (Biographical approach) [NOTE: This is a grade eight standard.]		
3.11 Evaluate the aesthetic qualities of style, including the impact of diction and figurative language on tone, mood, and theme, using the terminology of literary criticism. (Aesthetic approach)		
3.12 Analyze the way in which a work of literature is related to the themes and issues of its historical period. (Historical approach)		**1.29**

Table 3.5b

Field Test Passing Rates and Curriculum-Alignment (CA) Ratings for each English/Language Arts Content Standard—Writing

STRANDS/STANDARDS [BOLDED STANDARDS INDICATE PROBLEM AREAS]	PERCENT PASSING	AVERAGE CA RATING
1.0 Writing Strategies (Grades 9-10):		
Organization and Focus		
1.1 Establish a controlling impression or coherent thesis that conveys a clear and distinctive perspective on the subject and maintain a consistent tone and focus throughout the piece of writing.	**51%**	**1.94**
1.2 Use precise language, action verbs, sensory details, appropriate modifiers, and the active rather than the passive voice.	**50%**	**1.82**
Research and Technology		
1.3 Use clear research questions and suitable research methods (e.g., library, electronic media, personal interview) to elicit and present evidence from primary and secondary sources.	60%	2.20
1.4 Develop the main ideas within the body of the composition through supporting evidence (e.g., scenarios, commonly held beliefs, hypotheses, definitions).	52%	2.17
1.5 Synthesize information from multiple sources and identify complexities and discrepancies in the information and the different perspectives found in each medium (e.g., almanacs, microfiche, news sources, in-depth field studies, speeches, journals, technical documents).	**48%**	**1.69**
1.6 Integrate quotations and citations into a written text while maintaining the flow of ideas.	57%	1.79

(table continues)

Table 3.5b

Field Test Passing Rates and Curriculum-Alignment (CA) Ratings for each English/Language Arts Content Standard—Writing (Continued)

STRANDS/STANDARDS [BOLDED STANDARDS INDICATE PROBLEM AREAS]	PERCENT PASSING	AVERAGE CA RATING
Evaluation and Revision		
1.9 Revise writing to improve the logic and coherence of the organization and controlling perspective, the precision of word choice, and the tone by taking into consideration the audience, purpose, and formality of the context.	60%	1.90
2.0 Writing Applications (Genres and Their Characteristics)		
2.1 Write biographical or autobiographical narratives or short stories: a. Relate a sequence of events and communicate the significance of the e vents to the audience. b. Locate scenes and incidents in specific places. c. Describe with concrete sensory details the sights, sounds, and smells of a scene and the specific actions, movements, gestures, and feelings of the characters; use interior monologue to depict the characters' feelings. e. Make effective use of descriptions of appearance, images, shifting perspectives, and sensory details.	Essay	
2.2. Write responses to literature: a. Demonstrate a comprehensive grasp of the significant ideas of literary works. b. Support important ideas and viewpoints through accurate and detailed references to the text or to other works. c. Demonstrate awareness of the author's use of stylistic devices and an appreciation of the effects created. d. Identify and assess the impact of perceived ambiguities, nuances and complexities within the text.	Essay	
2.3 Write expository compositions, including analytical essays and research reports: a. Marshal evidence in support of a thesis and related claims, including information on all relevant perspectives. b. Convey information and ideas from primary and secondary sources accurately and coherently. c. Make distinctions between the relative value and significance of specific data, facts, and ideas. e. Anticipate and address readers' potential misunderstandings, biases, and expectations. f. Use technical terms and notations accurately.	Essay	2.27
2.4 Write persuasive compositions: **a. Structure ideas and arguments in a sustained and logical fashion.** **b. Use specific rhetorical devices to support assertions (e.g., appeal to logic through reasoning; appeal to emotion or ethical belief; relate a personal anecdote, case study, or analogy).** **c. Clarify and defend positions with precise and relevant evidence, including facts, expert opinions, quotations, and expressions of commonly accepted beliefs and logical reasoning.** **d. Address readers' concerns, counterclaims, biases, and expectations.**	**Essay**	**1.85**

(table continues)

Table 3.5b
Field Test Passing Rates and Curriculum-Alignment (CA) Ratings for each English/Language Arts Content Standard – Writing (Continued)

STRANDS/STANDARDS [BOLDED STANDARDS INDICATE PROBLEM AREAS]	PERCENT PASSING	AVERAGE CA RATING
2.5 Write business letters: **a. Provide clear and purposeful information and address the intended audience appropriately.** **b. Use appropriate vocabulary, tone, and style to take into account the nature of the relationship with, and the knowledge and interests of, the recipients.** **c. Highlight central ideas or images.** **d. Follow a conventional style with page formats, fonts, and spacing that contribute to the document's readability and impact.**	**Essay**	**1.80**
1.0 Written and Oral English Language Conventions (Grades 9 & 10):		
Grammar and Mechanics of Writing		
1.1 Identify and correctly use clauses (e.g., main and subordinate), phrases (e.g., gerund, infinitive, and participial), and mechanics of punctuation (e.g., semicolons, colons, ellipses, hyphens).	59%	2.35
1.2 Understand sentence construction (e.g., parallel structure, subordination, proper placement of modifiers) and proper English usage (e.g., consistency of verb tenses).	**49%**	**1.83**
1.3 Demonstrate an understanding of proper English usage and control of grammar, paragraph and sentence structure, diction, and syntax.	**53%**	**1.76**
Manuscript Form		
1.4 Produce Legible work that shows accurate spelling and correct use of the conventions of punctuation and capitalization.		
1.5 Reflect appropriate manuscript requirements, including title page presentation, pagination, spacing and margins, and integration of source and support material (e.g., in-text citation, use of direct quotations, paraphrasing) with appropriate citations.	50%	2.06

** Curriculum Alignment (CA) rating scale of how many students had the opportunity to learn this material in local district curriculum:

1. <50% 2. 50% – 74% 3. 75% – 94% 4. >95%

Information on the mathematics standards is shown in Table 3.6. It is not surprising that the Algebra 1 standards were most problematic. Currently, students are not required to take algebra to graduate in most districts. Within the Algebra 1 strand, it was particularly difficult to develop questions for some specific standards. Students responded at about chance level (that is, did not do better than random guessing) to all of the questions developed for the following Algebra 1 standards:

> 17.0 Students determine the domain of independent variables and the range of dependent variables defined by a graph, a set of ordered pairs, or a symbolic expression [an equation]. (% Pass=22, CA Rating=1.5)
>
> 23.0 Students apply quadratic equations to physical problems, such as the motion of an object under the force of gravity. (% Pass=33, CA Rating=1.7)
>
> 24.3 Students use counter examples to show that an assertion is false and recognize that a single counter example is sufficient to refute an assertion. (% Pass=26, CA Rating=1.6)

It was also difficult to write questions that many students could answer correctly for some mathematics reasoning standards. An example of a mathematical reasoning standard that had both low passing rates and low curriculum-alignment (CA) ratings was:

> 2.3 Estimate unknown quantities graphically and solve for them by using logical reasoning and arithmetic and algebraic techniques. (% Pass=23, CA Rating=2.1)

After reviewing questions for the fall field test at the July 2000 HSEE Panel meeting, one of the Panel members stated that she wished there was time to go back and clarify the content standards based on what she had learned from reviewing questions written to these standards. Information from field-test results and the curriculum-alignment ratings presented above might also be useful in developing explanatory material for specific standards. Such material is needed to help teachers align their instruction to these standards and to help students and parents understand more clearly the standards they are being asked to meet. Also, item writers can use this information to create questions that are clearly aligned to the content standards.

Table 3.6

Opportunity to Learn Ratings and Field Test Performance for Mathematics Strands

STRANDS/STANDARDS	PERCENT PASSING	AVERAGE CA RATING
Statistics, Data Analysis, and Probability		
(Grade 6)		
1.0 Students compute and analyze statistical measurements for data sets:		
1.1 Compute the range, mean, median, and mode of data sets.	49%	3.17
2.0 Students use data samples of a population and describe the characteristics and limitations of the samples:		
2.5 Identify claims based on statistical data and, in simple cases, evaluate the validity of the claims.	54%	2.82
3.0 Students determine theoretical and experimental probabilities and use these to make predictions about events:		
3.1 Represent all possible outcomes for compound events in an organized way (e.g., tables, grids, tree diagrams) and express the theoretical probability of each outcome.	36%	2.24
3.3 Represent probabilities as ratios, proportions, decimals between 0 and 1, and percentages between 0 and 100, and verify that the probabilities computed are reasonable; know that if P is the probability of an event, 1-P is the probability of an event not occurring.	54%	2.56
3.5 Understand the difference between independent and dependent events.	**44%**	**1.93**
(Grade 7)		
1.0 Students collect, organize, and represent data sets that have one or more variables and identify relationships among variables within a data set by hand and through the use of an electronic spreadsheet software program:		
1.1 Know various forms of display for data sets, including a stem-and-leaf plot or box-and-whisker plot; use the forms to display a single set of data or to compare two sets of data.	56%	2.63
1.2 Represent two numerical variables on a scatter plot and informally describe how the data points are distributed and any apparent relationship that exists between the two variables (e.g., between time spent on homework and grade level).	57%	2.71
1.3 Understand the meaning of, and be able to compute the minimum, the lower quartile, the median, the upper quartile, and the maximum of a data set.	40%	2.17

(table continues)

Table 3.6
Opportunity to Learn Ratings and Field Test Performance for Mathematics Strands (Continued)

STRANDS/STANDARDS	PERCENT PASSING	AVERAGE CA RATING
Number Sense (Grade 7)		
1.0 Students know the properties of, and compute with, rational numbers expressed in a variety of forms:		
1.1 Read, write, and compare rational numbers in scientific notation (positive and negative powers of 10) with approximate numbers using scientific notation.	54%	2.76
1.2 Add, subtract, multiply, and divide rational numbers (integers, fractions, and terminating decimals) and take positive rational numbers to whole-number powers	60%	2.81
1.3 Convert fractions to decimals and percents and use these representations in estimations, computations, and applications.	49%	2.83
1.6 Calculate the percentage of increases and decreases of a quantity.	39%	2.40
1.7 Solve problems that involve discounts, markups, commissions, and profit and compute simple and compound interest.	38%	2.54
2.0 Students use exponents, powers, and roots and use exponents in working with fractions:		
2.1 Understand negative whole-number exponents. Multiply and divide expressions involving exponents with a common base.	29%	2.36
2.2 Add and subtract fractions by using factoring to find common denominators.	48%	2.38
2.3 Multiply, divide, and simplify rational numbers by using exponent rules.	59%	2.38
2.4 Use the inverse relationship between raising to a power and extracting the root of a perfect square integer; for an integer that is not square, determine without a calculator the two integers between which its square root lies and explain why.	47%	2.33
2.5 Understand the meaning of the absolute of a number; interpret the absolute value as the distance of the number from zero on a number line; and determine the absolute value of real numbers.	57%	2.33

(table continues)

Table 3.6

Opportunity to Learn Ratings and Field Test Performance for Mathematics Strands (Continued)

STRANDS/STANDARDS	PERCENT PASSING	AVERAGE CA RATING
Algebra and Functions (Grade 7)		
1.0 Students express quantitative relationships by using algebraic terminology, expressions, equations, inequalities, and graphs:		
1.1 Use variables and appropriate operations to write an expression, an equation, an inequality, or a system of equations or inequalities that represents a verbal description (e.g., three less than a number, half as large as area A).	51%	2.39
1.2 Use the correct order of operations to evaluate [simplify] algebraic expressions such as 3 $(2x+5)^2$.	65%	2.74
1.5 Represent quantitative relationships graphically and interpret the meaning of a specific part of a graph in the situation represented by the graph.	60%	2.72
2.0 Students interpret and evaluate expressions involving integer powers and simple roots:		
2.1 Interpret positive whole-number powers as repeated multiplication and negative whole-number powers as repeated division or multiplication by the multiplicative inverse. Simplify and evaluate expressions that include exponents.	51%	2.33
2.2 Multiply and divide monomials; extend the process of taking powers and extracting roots to monomials when the latter results in a monomial with an integer exponent.	32%	2.33
3.0 Students graph and interpret linear and some nonlinear functions:		
3.1 Graph functions of the form Y=nx2 and y=nx3 and use in solving problems.	**33%**	**1.93**
3.3 Graph linear functions, noting that the vertical change (change in-y value) per unit of horizontal change (change in x -value) is always the same and know that the ratio ("rise over run") is called the slope of a graph.	47%	2.41
3.4 Plot the values of quantities whose ratios are always the same (e.g., cost to the number of an item, feet to inches, circumference to diameter of a circle). Fit a line to the plot and understand that the slope of a line equals the [ratio of the] quantities.	**48%**	**1.90**

(table continues)

Table 3.6
Opportunity to Learn Ratings and Field Test Performance for Mathematics Strands (Continued)

STRANDS/STANDARDS	PERCENT PASSING	AVERAGE CA RATING
4.0 Students solve simple linear equations and inequalities over the rational numbers:		
4.1 Solve two-step linear equations and inequalities in one variable over the rational numbers, interpret the solution or solutions in the context from which they arose, and verify the reasonableness of the results.	62%	2.59
4.2 Solve multi-step problems involving rate, average speed, distance, and time or a direct variation.	43%	2.05
Measurement and Geometry (Grade 7)		
1.0 Students choose appropriate units of measure and use ratios to convert within and between measurement systems to solve problems:		
1.1 Compare weights, capacities, geometric measures, times, and temperatures within and between measurement systems (e.g., miles per hour and feet per second, cubic inches to cubic centimeters).	44%	2.47
1.2 Construct and read drawings and models made to scale.	43%	2.38
1.3 Use measures expressed as rates (e.g., speed, density) and measures expressed as products (e.g., person-days) to solve problems; check the units of the solutions; and use dimensional analysis to check the reasonableness of the answer.	67%	2.80
2.0 Students compute the perimeter, area, and volume of common geometric objects and use the results to find measures of less common objects. They know how perimeter, area and volume are affected by changes of scale:		
2.1 Use formulas routinely for finding the perimeter and area of basic two-dimensional figures and the surface area and volume of basic three-dimensional figures, including rectangles, parallelograms, trapezoids, squares, triangles, circles, prisms, and cylinders.	42%	2.69
2.2 Estimate and compute the [surface] area of more complex or irregular two-and three-dimensional figures by breaking the figures down into more basic geometric objects.	46%	2.36

(table continues)

Table 3.6

Opportunity to Learn Ratings and Field Test Performance for Mathematics Strands (Continued)

STRANDS/STANDARDS	PERCENT PASSING	AVERAGE CA RATING
2.3 Compute the length of the perimeter, the surface area of the faces, and the volume of a three-dimensional object built from rectangular solids. Understand that when the lengths of all dimensions are multiplied by a scale factor, the surface area is multiplied by the square of the scale factor and the volume is multiplied by the cube of the scale factor.	45%	2.11
2.4 Relate the changes in measurement with a change of scale to the units used (e.g., square inches, cubic feet) and to conversions between units (1 square foot = 144 square inches or [1 ft^2] = {144 in^2}, 1 cubic inch is approximately 16.38 cubic centimeters or [1 in^3] = [16.38 cm^3].	44%	2.26
3.0 Students know the Pythagorean theorem and deepen their understanding of plane and solid geometric shapes by constructing figures that meet given conditions and by identifying attributes of figures:		
3.2 Understand and use coordinate graphs to plot simple figures, determine lengths and areas related to them, and determine their images under translations and reflections.	**42%**	**1.96**
3.3 Know and understand the Pythagorean theorem and its converse and use it to find the length of the missing side of a right triangle and the lengths of other line segments and, in some situations, empirically verify the Pythagorean theorem by direct measurement.	42%	2.18
3.4 Demonstrate an understanding of conditions that indicate two geometrical figures are congruent and what congruence means about relationships between the sides and angles of the two figures.	52%	1.94
Mathematical Reasoning (Grade 7)		
1.0 Students make decisions about how to approach problems:		
1.1 Analyze problems by identifying relationships, distinguishing relevant from irrelevant information, identifying missing information, sequencing and prioritizing information, and observing patterns.	54%	2.55
1.2 Formulate and justify mathematical conjectures based on a general description of the mathematical question or problem posed.	42%	2.36

(table continues)

Table 3.6
Opportunity to Learn Ratings and Field Test Performance for Mathematics Strands (Continued)

STRANDS/STANDARDS	PERCENT PASSING	AVERAGE CA RATING
2.0 Students use strategies, skills, and concepts in finding solutions:		
2.1 Use estimation to verify the reasonableness of calculated results.	52%	2.93
2.3 Estimate unknown quantities graphically and solve for them by using logical reasoning and arithmetic and algebraic techniques.	23%	2.1
2.4 Make and test conjectures by using both inductive and deductive reasoning.	55%	2.31
3.0 Students determine a solution is complete and move beyond a particular problems by generalizing to other situations:		
3.1 Evaluate the reasonableness of the solution in the context of the original	47%	2.47
3.3 Develop generalizations of the results obtained and the strategies used and apply them to new problem situations.	57%	2.23
Algebra 1		
1.0 Students identify and use the arithmetic properties of subsets of integers and rational, irrational, and real numbers, including closure properties for the four basic arithmetic operations where applicable.		
2.0 Students understand and use such operations as taking the opposite, finding the reciprocal, and taking a root, and raising to a fractional power. They understand and use the rules of exponents.	43%	2.38
3.0 Students solve equations and inequalities involving absolute values.	35%	2.19
4.0 Students simplify expressions before solving linear equations and inequalities in one variable, such as $3(2x-5) + 4(x-2) = 12$.	40%	2.45
5.0 Students solve multi-step problems, including word problems, involving linear equations and linear inequalities in one variable and provide justification for each step.	43%	2.23
6.0 Students graph a linear equation and compute the x-and y- intercepts (e.g., graph $2x + 6y = 4$). They are also able to sketch the region defined by linear inequality (e.g., they sketch the region defined by $2x + 6y < 4$).	40%	2.31

(table continues)

Table 3.6

Opportunity to Learn Ratings and Field Test Performance for Mathematics Strands (Continued)

STRANDS/STANDARDS	PERCENT PASSING	AVERAGE CA RATING
7.0 Students verify that a point lies on a line, given an equation of the line. Students are able to derive linear equations by using the point-slope formula.	39%	2.24
8.0 Students understand the concepts of parallel lines and perpendicular lines and how those slopes are related. Students are able to find the equation of a line perpendicular to a given line that passes through a given point.	44%	2.24
9.0 Students solve a system of two linear equations in two variables algebraically and are able to interpret the answer graphically. Students are able to solve a system of two linear inequalities in two variables and to sketch the solution sets.	**44%**	**1.86**
10.0 Students add, subtract, multiply, and divide monomials and polynomials. Students solve multi-step problems, including word problems, by using these techniques.	**31%**	**1.55**
15.0 Students apply algebraic techniques to solve rate problems, work problems, and percent mixture problems.	**29%**	**1.76**
16.0 Students understand the concepts of a relation and a function, determine whether a given relation defines a function, and give pertinent information about given relations and functions.	32%	2.14
17.0 Students determine the domain of independent variables and the range of dependent variables defined by a graph, a set of ordered pairs, or a symbolic expression [an equation].	**22%**	**1.50**
18.0 Students determine whether a relation defined by a graph, a set of ordered pairs, or a symbolic expression [an equation] is a function and justify the conclusion.	**33%**	**1.94**
21.0 Students graph quadratic functions and know that their roots are the x-intercepts.	**27%**	**1.53**
23.0 Students apply quadratic equations to physical problems, such as the motion of an object under the force of gravity.	**33%**	**1.65**
24.0 Students use and know simple aspects of a logical argument:		
24.2 Students identify the hypothesis and conclusion in logical deduction.		
24.3 Students use counter examples to show that an assertion is false and recognize that a single counter example is sufficient to refute an assertion.	**26%**	**1.60**

(table continues)

Table 3.6

Opportunity to Learn Ratings and Field Test Performance for Mathematics Strands (Continued)

STRANDS/STANDARDS	PERCENT PASSING	AVERAGE CA RATING
25.0 Students use properties of the number system to judge the validity of results, to justify each step of a procedure, and to prove or disprove statements:		
25.1 Students use properties of numbers to construct simple, valid arguments (direct and indirect) for, or formulate counterexamples to, claimed assertions.		
25.2 Students judge the validity of an argument according to whether the properties of the real number system and the order of operations have been applied correctly at each step.		
25.3 Given a specific algebraic statement involving linear, quadratic, or absolute value expressions or equations or inequalities, students determine whether the statement is true sometimes, always, or never.		

** Curriculum Alignment (CA) rating scale of how many students had the opportunity to learn this material in local district curriculum:

1. <50% 2. 50% – 74% 3. 75% – 94% 4. >95%